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The use of impedance measurements to detect the presence of pathogens attached to antibody-coated beads. In a fluidic device antibodies are immobilized on a surface of a patterned interdigitated electrode. Pathogens in a sample fluid streaming past the electrode attach to the immobilized antibodies, which produces a change in impedance between two adjacent electrodes, which impedance change is measured and used to detect the presence of a pathogen. To amplify the signal, beads coated with antibodies are introduced and the beads would stick to the pathogen causing a greater change in impedance between the two adjacent electrodes.